ABSTRACT

PT Ayik Batu Gung is a heavy equipment rental service contractor. The Komatsu GD535-5 motor grader heavy equipment unit that is rented often experiences low power engine problems. It is assumed as the effect of the use of B30 fuel which is biodiesel fuel with a content of 30% vegetable oil and 70% diesel oil. Engine low power that occurs in the Komatsu GD535-5 motor grader unit is a reduced engine power when the unit is loading or operating normally, indicated by the dramatic lower than the standard pace of engine speed.

Based on these problems, a research was conducted using the comparison method of pure B30 fuel as much as 271 Liters according to the maximum volume of the motor grader fuel tank and comparisons were made on B30 fuel that had been mixed with additives of the STP Fuel Treatment type as much as 1.18 liters. Several stages of research were; testing the value of exhaust gas opacity, testing engine speed, testing fuel density and temperature and calculating operating costs on the unit.

The conducted research showed, the highest exhaust gas opacity value is 44.5% using pure B30 fuel and 12% using B30 fuel with additives. This result shows that there is a very significant decrease in the opacity value. Meanwhile, the operational costs of the unit under optimal conditions, is IDR121,959,000 and nonoptimal condition is IDR87,759,000. So, the comparison of operational costs is IDR34,200,000 (optimal condition unit minus the suboptimal condition unit).

Keywords: *Motor Grader, Diesel Engine, Low Power, Opacity, Operational Cost, Additives, B30, Fuel.*

INTI SARI

PT Ayik Batu Gung merupakan sebuah kontraktor jasa penyewaan alat berat. Pada *unit* alat berat motor grader Komatsu GD535-5 yang disewakan sering mengalami masalah *engine low power,* hal ini disebabkan oleh penggunaan bahan bakar B30 yang merupakan bakan bakar biodiesel dengan kandungan 30% minyak nabati dan 70% minyak solar. *Engine low power* yang terjadi pada *unit* motor grader Komatsu GD535-5 adalah berkurangnya tenaga pada mesin ketika *unit loading* atau beroperasi secara normal dibuktikan dengan putaran mesin yang menurun drastis dari standar.

Berdasarkan permasalahan tersebut, maka dilakukan penelitian dengan menggunakan metode perbandingan bahan bakar B30 murni sebanyak 271 Liter sesuai dengan volume maksimal tangki bahan bakar motor grader dan dilakukan perbandingan pada bahan bakar B30 yang telah dicampurkan zat aditif tipe STP *Fuel Treatment* sebanyak 1,18 liter. Ada beberapa tahap penelitian yaitu pengujian nilai opasitas gas buang, pengujian putaran mesin, pengujian densitas dan temperatur bahan bakar serta perhitungan biaya operasioanl pada unit.

Berdasarkan hasil pengujian didapatkan nilai opasitas gas buang tertinggi sebesar 44,5% ketika unit menggunakan bahan bakar B30 murni dan 12% ketika menggunakan bahan bakar B30 ditambah zat aditif. Hal ini menunjukkan bahwa terjadi penurunan nilai opasitas yang sangat signifikan. Sedangkan ketika dilakukan perhitungan biaya operasional pada *unit* saat kondisi optimal adalah sebesar Rp. 121.959.000 dan kondisi tidak optimal Rp. 87.759.000, sehingga perbandingan biaya operasional adalah sebesar Rp. 34.200.000 didapatkan dari *unit* kondisi optimal dikurang *unit* kondisi tidak optimal.

Kata Kunci*:* *Motor Grader, Diesel Engine, Low Power, Opacity, Operational Cost*, Zat Aditif, B30, *Fuel.*